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**XXV. Note on the Tides in the Port of London. By J. W. LUBBOCK, Esq.
V.P. and Treas. R.S.**

Read June 25, 1832.

MR. STRATFORD has favoured me with a comparison of the predicted times of high water deduced from Mr. BULPIT's Tables, WHITE's Ephemeris, and the British Almanac, with the observations at the London Docks. These observations are, unfortunately, so imperfect, that the differences must not be entirely attributed to the errors of the Tables, which, however, seem susceptible of much improvement. I subjoin this comparison; and in order to convey an idea of the confidence which may be placed in the observations, I also subjoin a comparison, by Mr. DEACON, of the observations at the London and St. Katherine's Docks, which are made according to the same plan, and of which the merit is the same. The differences in the determinations at these two places, which are only about a quarter of a mile distant from each other, may serve to indicate the reliance which can be placed in either.

In my paper on the Tides at Brest, I remarked that the retard or the constant $\lambda - \lambda'$, is considerably greater as deduced from observation here than at Brest. That this must be the case is also evident from the following very simple à priori considerations.—The highest high water takes place when the moon passes the meridian at a time equal to the retard. The tide is propagated from Brest to London, round Scotland, in about twenty-two hours, that is, supposing the tide which takes place in our river to be principally due to that branch of the tide which descends along the eastern coast of Great Britain, which I believe to be the case. The *highest tide* therefore is propagated from Brest to London in about twenty-two hours, and the difference in the retard or in the constant $\lambda - \lambda'$, will be nearly the moon's motion in twenty-two hours, or about 11° ; I made the difference in the retard from observation 10° . The tide takes about fifteen hours to reach Brest from the Cape of Good Hope; no doubt the retard there is considerably less.

1832.

Days.		January.			February.			March.		
		B—O	G—O	L—O	B—O	G—O	L—O	B—O	G—O	L—O
1	M	m. + 3	m. - 20	m. - 18	m. - 17	m. - 33	m. - 18	m. - 14	m. - 35	m. - 11
	A	+ 10	- 11	- 13	- 13	- 24	- 11	- 23	- 40	- 19
2	M	+ 7	- 13	- 18	+ 3	- 7	+ 6	- 8	- 22	- 7
	A	+ 12	- 6	- 14	+ 2	- 6	+ 2	- 2	- 14	- 4
3	M	+ 5	- 8	- 19	- 2	- 10	+ 4	- 2	- 16	- 0
	A	+ 15	+ 9	- 5	0	- 9	+ 6	- 5	- 17	- 2
4	M	+ 13	+ 6	- 6	+ 7	- 3	+ 13	- 4	- 16	- 1
	A	+ 11	+ 3	- 9	- 9	- 18	+ 1	0	- 10	+ 6
5	M	+ 14	+ 9	+ 2	+ 3	- 7	+ 14	- 17	- 14	+ 3
	A	+ 6	+ 6	- 1	- 4	- 16	+ 9	- 12	- 18	+ 3
6	M	+ 1	+ 1	- 5	- 7	- 18	+ 7	+ 10	+ 7	+ 25
	A	- 5	- 5	- 5	+ 6	- 4	+ 23	- 13	- 4	+ 11
7	M	- 4	- 2	- 0	- 1	- 10	+ 17	- 19	- 19	- 5
	A	- 11	+ 9	- 3	- 2	- 12	+ 18	+ 8	+ 6	+ 17
8	M	- 3	+ 4	+ 14	- 12	- 19	+ 5	- 1	- 1	+ 5
	A	- 7	- 3	+ 10	- 19	- 26	- 6	- 1	+ 3	+ 2
9	M	+ 2	+ 7	+ 20	- 5	- 10	+ 6	+ 5	+ 11	- 1
	A	- 9	- 3	+ 12	- 15	- 19	- 9	- 4	+ 4	- 16
10	M	- 2	+ 4	+ 22	+ 10	+ 8	+ 8	- 6	- 2	- 25
	A	- 13	- 9	+ 13	- 9	- 5	- 24	- 9	+ 7	- 31
11	M	+ 14	+ 18	+ 36	+ 9	+ 11	- 11	0	+ 17	- 22
	A	+ 3	+ 5	+ 23	- 15	- 8	- 33	- 23	+ 3	- 39
12	M	- 4	+ 8	+ 16	- 9	0	- 22	- 1	+ 27	- 2
	A	+ 3	+ 6	+ 12	- 32	- 24	- 44	- 29	- 19	- 27
13	M	+ 14	+ 19	+ 21	- 7	0	- 20	- 25	- 6	- 17
	A	- 12	- 4	- 6	.....	.....	.....	- 19	.....	- 15
14	M	- 3	+ 9	+ 1	.....	- 11	.....	- 6	.....	.....
	A	- 22	- 8	- 20	- 8	- 5	- 13	- 6	- 2	- 3
15	M	- 12	+ 4	- 12	- 1	+ 2	- 6	0	+ 3	+ 4
	A	.....	.....	.....	+ 7	+ 10	+ 8	+ 3	+ 3	+ 6
16	M	- 21	- 4	- 27	- 7	- 1	- 3	+ 2	+ 4	+ 8
	A	- 63*	- 48*	- 72*	+ 3	+ 6	+ 7	- 5	- 3	+ 1
17	M	- 7	- 1	- 18	+ 3	+ 4	+ 7	+ 7	+ 11	+ 13
	A	- 5	+ 12	- 15	+ 11	+ 6	+ 17	+ 4	+ 3	+ 8
18	M	- 2	+ 15	- 9	+ 7	+ 3	+ 20	+ 17	+ 16	+ 21
	A	- 6	+ 16	- 2	- 6	+ 16	+ 5	- 8	- 8	+ 2
19	M	+ 18	+ 28	+ 13	- 12	- 19	+ 5	+ 2	+ 3	+ 15
	A	- 6	+ 11	+ 4	- 25	- 35	- 10	- 6	- 6	+ 7
20	M	- 2	+ 4	+ 3	- 11	- 20	+ 3	+ 1	0	+ 11
	A	- 11	- 1	+ 5	- 9	- 23	+ 2	- 2	- 1	+ 6
21	M	- 18	- 10	0	- 9	- 25	0	- 4	- 2	+ 2
	A	- 5	- 2	+ 13	- 18	- 26	- 14	- 18	- 13	- 15
22	M	- 7	- 9	+ 12	- 10	- 26	- 8	- 6	+ 1	- 7
	A	- 9	- 15	+ 11	- 11	- 24	- 14	- 5	+ 8	- 5
23	M	- 0	- 10	+ 17	- 5	- 26	- 15	- 7	+ 11	- 10
	A	- 6	- 18	+ 10	- 11	- 11	- 26	- 1	+ 20	- 8
24	M	- 4	- 16	+ 11	- 9	- 11	- 24	+ 9	+ 30	- 2
	A	- 14	- 28	- 7	+ 2	- 11	- 29	- 2	+ 13	- 24
25	M	+ 4	- 10	+ 11	+ 17	0	- 19	+ 7	+ 16	- 23
	A	0	- 13	+ 4	+ 20	+ 3	- 16	- 26	+ 38	- 1
26	M	+ 17	+ 4	+ 18	+ 3	- 18	- 32	+ 15	+ 16	- 19
	A	+ 8	- 10	+ 1	- 16	- 41	- 44	+ 6	+ 4	- 19
27	M	+ 5	- 14	- 3	- 13	- 39	- 30	+ 19	- 27	- 35
	A	+ 5	- 23	- 9	- 20	- 57	- 32	- 11	- 21	- 20
28	M	+ 10	- 21	- 9	.....	.....	.....	- 7	- 20	- 6
	A	+ 9	- 26	- 9	.....	.....	.....	- 8	- 11	- 11
29	M	+ 10	- 25	- 6	- 12	- 37	- 13	.....	.....	- 20
	A	.....	.....	.....	- 18	- 40	- 16	- 5	- 9	- 2
30	M	- 4	.....	- 17	.....	.....	.....	0	- 14	+ 2
	A	- 4	- 31	- 12	.....	.....	.....	- 6	- 18	- 7
31	M	- 2	- 26	- 8	.....	.....	.....	- 6	- 15	- 9
	A	- 13	- 31	- 13	.....	.....	.....	- 8	- 11	- 11

* These differences evidently arise from an error in the observation.

This Table contains the results of a comparison of the *predicted* times of high water at the London Docks, with observations of the same, made morning and afternoon, in the months of January, February, and March, 1832.

The *predicted* times have been deduced from BULPIT's Tide Tables, WHITE's Ephemeris, and the British Almanac.

BULPIT's Tables contain the *mean* time of high water at the entrance gate of the East India Docks. The time of high water at the London Docks has been found by adding twenty minutes to the time given by BULPIT.

WHITE's Ephemeris and the British Almanac give the time of high water at London Bridge : these times have been decreased by ten minutes, to obtain the time for the London Docks.

M denotes the *morning* } tides.
 A ————— *afternoon* }

B denotes the time of high water at the London Docks, as deduced from
 BULPIT's Tables.

G do. from WHITE's Ephemeris.

L do. from British Almanac.

O do. as observed.

Wherever blanks occur, it is to be understood that there has not been any tide observed or predicted,—as on the afternoon of Jan. 15 ; or that the objects of comparison fail, as on the afternoon of Feb. 13, and morning of the 14th, where BULPIT would indicate a tide at 11^h 52^m, which did not in fact occur, and give no tide for the morning of the 14th to compare with an observation on that day.

W. S. S.

June 8, 1832.

	Time.			Difference.	Height of Tide.			Time.			Difference.	Height of Tide.			Difference.
	London Docks.	St. Katherine's Docks.			London Docks.	St. Katherine's Docks.		London Docks.	St. Katherine's Docks.			London Docks.	St. Katherine's Docks.		
	h m	h m	m		ft. in.	ft. in.	ft. in.	h m	h m	m		ft. in.	ft. in.	ft. in.	
Jan. 1	0 55	1 10	+15		20 9	25 9	+5 0	1 10	1 15	+5 5		20 8	25 8	+5 0	
	1 35	1 45	+10		21 0	26 1	+5 1	1 50	2 0	+10		21 3	26 5	+5 2	
	2 15	2 15	0		21 8	26 7	+4 11	2 20	2 38	+18		22 0	26 11	+4 11	
	2 40	2 50	+10		22 0	26 11	+4 11	3 0	3 10	+10		22 0	26 11	+4 11	
	3 10	3 20	+10		22 0	27 0	+5 0	3 30	3 43	+13		22 5	27 4	+4 11	
	3 50	4 0	+10		22 4	27 4	+5 0	4 10	4 15	+5		22 2	27 0	+4 10	
	4 25	4 30	+5		22 3	27 3	+5 0	4 50	4 43	-7		21 10	26 9	+4 11	
	4 55	4 45	-10		22 0	27 1	+5 1	5 20	5 25	+5		21 5	26 3	+4 10	
	5 30	5 38	+8		21 2	26 2	+5 0	6 0	6 5	+5		21 1	26 2	+5 1	
	6 15	6 13	-2		21 2	25 5	+4 3	6 50	6 43	-7		20 9	25 10	+4 11	
	6 50	6 53	+3		20 9	25 9	+5 0	7 30	7 38	+8		20 3	25 3	+5 0	
	8 0	8 8	+8		20 5	25 5	+5 0	8 35	8 45	+10		20 6	25 6	+5 0	
	9 0	9 8	+8		20 3	25 2	+4 11	10 0	10 5	+5		21 11	26 10	+4 11	
	10 25	10 23	+3		20 0	25 0	+5 0	11 20	11 25	+5		21 0	26 0	+5 0	
	11 45	11 50	+5		20 6	25 4	+4 10								
	0 50	0 30	-20		21 2	26 1	+4 11	1 45	1 48	+3		20 10	26 9	+5 11	
	1 20	1 30	+10		22 2	27 2	+5 0	1 45	1 48	+3		22 10	26 10	+4 0	
	2 10	2 10	0		22 9	27 9	+5 0	2 30	2 38	+8		23 3	28 2	+4 11	
	2 40	3 5	+25		23 0	28 1	+5 1	3 15	3 33	+18		23 3	28 2	+4 11	
	3 40	3 48	+8		23 1	28 0	+4 11	4 5	4 15	+10		23 3	28 2	+4 11	
	4 35	4 35	0		23 0	27 10	+4 10	4 45	5 5	+20		22 7	28 4	+5 9	
	5 10	5 20	+10		22 6	27 6	+5 0	5 35	5 48	+13		22 0	27 0	+5 0	
	5 50	6 3	+13		21 7	26 6	+4 11	6 20	6 38	+18		21 3	26 2	+4 11	
	6 40	6 43	+3		20 6	25 6	+5 0	7 15	7 25	+10		19 10	24 8	+4 10	
	7 20	7 18	-2		19 7	23 11	+4 4	7 50	8 0	+10		20 7	25 6	+4 11	
	8 0	8 6	+6		19 8	24 8	+5 0	8 45	8 53	+8		19 7	24 6	+4 11	
	9 20	9 25	+5		19 11	24 8	+4 9	10 0	10 0	0		18 7	23 7	+5 0	
	10 30	10 53	+23		18 7	23 6	+4 11	11 5	11 18	+13		18 11	23 10	+4 11	
	11 35	11 18	-17		20 7	23 10	+3 3								
	0 15	0 25	+10		20 4	25 4	+5 0	0 40	0 48	+8		19 3	24 3	+5 0	
	1 0	1 10	+10		21 5	26 4	+4 11	1 30	1 35	+5		21 1	25 11	+4 10	

	Time.		Difference.	Height of Tide.		Difference.	Time.		Difference.	Height of Tide.		Difference.
	London Docks.	St. Katherine's Docks.		London Docks.	St. Katherine's Docks.		London Docks.	St. Katherine's Docks.		London Docks.	St. Katherine's Docks.	
Feb. 1	h m	h m	m	ft. in.	ft. in.	ft. in.	h m	h m	m	ft. in.	ft. in.	ft. in.
1	55	55	0	21	1	26	1	+5	0	21	3	+5 0
2	2 15	2 15	0	22	3	27	2	+4	11	22	6	+4 10
3	2 55	2 55	0	22	5	27	5	+5	0	23	5	+4 11
4	3 20	3 20	0	22	0	27	0	+5	0	3 10	3 20	+4 11
5	3 55	4 0	+5	22	7	27	6	+4	11	4 20	4 35	+4 9
6	4 40	4 38	-2	21	8	26	9	+4	11	4 45	5 8	+4 8
7	5 10	5 5	-5	22	1	27	1	+5	0	5 30	5 45	+4 10
8	6 0	5 53	-7	22	0	26	2	+4	2	6 30	6 35	+4 11
9	6 40	6 40	0	21	0	26	0	+5	0	7 15	7 23	+5 0
10	7 20	7 30	+10	20	6	25	6	+5	0	8 15	8 23	+5 1
11	8 30	8 45	+15	19	9	24	8	+4	11	9 30	9 41	+5 0
12	10 0	10 15	+15	20	6	25	5	+4	11	11 5	11 5	0
13	11 20	11 30	+10	20	3	25	3	+5	0	20 9	25 8	+4 11
14	0 10	0 18	+8	20	9	25	8	+4	11	0 35	0 43	+4 10
15	1 0	1 8	+8	21	9	26	7	+4	10	1 20	1 40	+5 11
16	2 0	2 6	+6	22	5	27	5	+5	0	2 15	2 30	+4 10
17	2 40	2 53	+13	22	7	27	7	+5	0	2 55	3 20	+2 25
18	3 15	3 35	+20	23	4	28	3	+4	11	3 50	4 5	+1 15
19	4 10	4 21	+11	22	10	27	9	+4	11	4 45	4 51	+6 6
20	4 50	5 10	+20	22	0	26	11	+4	11	5 10	5 33	+2 23
21	5 30	5 35	+5	21	7	26	6	+4	11	6 0	6 5	+5 5
22	6 10	6 16	+6	21	5	26	2	+4	9	6 30	6 35	+5 10
23	6 45	6 55	+10	19	10	24	8	+4	10	7 15	7 23	+8 7
24	7 30	7 40	+10	19	2	24	0	+4	10	8 0	7 58	-2 18
25	8 20	8 43	+23	18	2	23	1	+4	11	8 50	9 8	+18 18
26	9 45	9 8	-37	13	5	23	5	+5	0	10 40	10 46	+6 17
27	11 10	11 18	+8	18	8	23	8	+5	0	11 50	11 53	+3 19
28	.....	.....	.....	.....	.....	.....	.....	.....	0 20	0 30	+10 19	+7 7
29	0 40	0 53	+13	20	0	24	11	+4	11	1 10	1 20	+10 20

	Time.		Difference.	Height of Tide.		Difference.	Time.		Difference.	Height of Tide.		Difference.	
	London Docks.	St. Katherine's Docks.		London Docks.	St. Katherine's Docks.		London Docks.	St. Katherine's Docks.		London Docks.	St. Katherine's Docks.		
	h m	h m		m	ft. in.		ft. in.	ft. in.		h m	ft. in.		
March 1	1 30	1 35	+ 5	20 2	25 2	+ 5 0	2 0	1 58	- 2	21 0	25 10	+ 4 10	
	2 2	5	2 10	+ 5	21 2	26 2	+ 5 0	2 20	2 35	+ 15	21 5	26 5	+ 5 0
	3 2	40	2 46	+ 6	21 4	26 3	+ 4 11	3 0	3 11	+ 11	20 10	25 9	+ 4 11
	4 3	15	3 20	+ 5	21 0	25 11	+ 4 11	3 25	3 30	+ 5	21 6	27 4	+ 5 10
	5 3	45	3 45	0	21 3	26 2	+ 4 11	4 5	4 14	+ 9	21 5	26 4	+ 4 11
	6 4	0	4 10	+ 10	22 11	27 10	+ 4 11	4 30	4 45	+ 15	19 10	24 8	+ 4 10
	7 5	5	5 15	+ 10	21 6	26 4	+ 4 10	5 0	5 8	+ 8	22 11	27 10	+ 4 11
	8 5	30	5 24	- 6	23 1	28 0	+ 4 11	5 50	6 0	+ 10	21 11	26 10	+ 4 11
	9 6	10	6 15	+ 5	21 11	26 10	+ 4 11	6 45	6 48	+ 3	20 10	25 9	+ 4 11
	10 7	15	7 15	0	20 7	25 7	+ 5 0	7 50	7 55	+ 5	19 8	24 7	+ 4 11
	11 8	15	8 18	+ 3	19 6	24 5	+ 4 11	9 15	9 18	+ 3	20 0	25 0	+ 5 0
	12 9	30	9 40	+ 10	19 9	24 8	+ 4 11	10 45	10 45	0	19 7	27 4	+ 7 9
	13 11	20	11 18	- 2	20 3	25 2	+ 4 11	12 0	0 5	+ 5	20 6	25 6	+ 5 0
	14	0 25	0 23	- 2	21 3	26 2	+ 4 11
	15 0 50	1 8	+ 18	21 6	26 7	+ 5 1	1 15	1 23	+ 8	23 0	27 10	+ 4 10	
	16 1 40	1 50	+ 10	22 3	27 2	+ 4 11	2 10	2 13	+ 3	22 0	26 10	+ 4 10	
	17 2 20	2 25	+ 5	21 6	26 5	+ 4 11	2 45	2 55	+ 10	23 10	28 8	+ 4 10	
	18 2 50	2 55	+ 5	23 0	27 9	+ 4 9	3 30	3 30	0	23 0	28 1	+ 5 1	
	19 3 35	3 35	0	24 0	28 11	+ 4 11	4 0	4 10	+ 10	21 6	27 4	+ 5 10	
	20 4 10	4 18	+ 8	22 2	27 2	+ 5 0	4 30	4 33	+ 3	23 9	28 9	+ 5 0	
	21 4 50	4 56	+ 6	22 0	27 2	+ 5 2	5 20	5 30	+ 10	21 6	26 5	+ 4 11	
	22 5 25	5 30	+ 5	21 8	26 7	+ 4 11	5 40	5 55	+ 15	20 10	25 7	+ 4 9	
	23 6 0	6 5	+ 5	20 8	25 7	+ 4 11	6 15	6 30	+ 15	20 4	25 4	+ 5 0	
	24 6 30	6 40	+ 10	19 0	23 11	+ 4 11	7 15	7 20	+ 5	19 1	24 0	+ 4 11	
	25 7 40	7 38	- 2	18 6	22 4	+ 3 10	7 50	7 48	- 2	17 0	21 10	+ 4 10	
	26 8 45	8 48	+ 3	17 7	22 5	+ 4 10	9 30	9 40	+ 10	17 0	21 11	+ 4 11	
	27 10 35	10 40	+ 5	18 10	23 9	+ 4 11	11 0	11 5	+ 5	18 1	23 0	+ 4 11	
	28 11 30	11 48	+ 18	19 0	23 10	+ 4 10							
	29 0 15	0 10	- 5	19 4	24 4	+ 5 0	0 30	0 48	+ 18	21 3	26 1	+ 4 10	
	30 0 50	1 2	+ 12	20 5	25 4	+ 4 11	1 20	1 32	+ 12	21 7	26 7	+ 5 0	
	31 1 50	1 40	+ 10	21 8	26 6	+ 4 10	2 0	2 5	+ 5	22 3	27 2	+ 4 11	